

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KENICHI KURIHARA

Appeal No. 1998-2878
Application No. 08/539,069

ON BRIEF

Before HAIRSTON, JERRY SMITH, and LEVY, Administrative Patent Judges.

HAIRSTON, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 7 through 12.

The disclosed invention relates to a semiconductor device that has a chip bonded to lead terminals via an insulating layer. Each of the lead terminals includes a bonding part that is

adhered to the insulating layer, and each of the lead terminals has a portion that is smaller in width than the width of the bonding part.

Claim 7 is illustrative of the claimed invention, and it reads as follows:

7. A semiconductor device comprising: a semiconductor chip having at least one bonding pad; an insulating layer selectively formed on said semiconductor chip; at least one lead terminal provided for said at least one bonding pad, said at least one lead terminal including a bonding part adhered to said insulating layer and an inner lead, said inner lead having a first portion projecting from said insulating layer toward said bonding pad and a second portion disposed between said bonding part and said first portion and adhered to said insulating layer; said second portion extending from said bonding part in a first direction toward said first portion with a width that is smaller than a width of said bonding part, and having a first bent segment on said insulating layer extending in a second direction perpendicular to said first direction and a second bent segment on said insulating layer extending in said first direction and joining said first portion; and at least one bonding wire connecting said at least one bonding pad to said bonding part of said at least one lead terminal.

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The references¹ relied on by the examiner are:

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| Mitsui et al. (Mitsui) | 2-18956 | Jan. 23, 1990 |
| (published Japanese Kokai Koho Application) | | |
| Kinoshita | 4-165661 | Jun. 11, |
| 1992 | | |
| (published Japanese Kokai Koho Application) | | |

¹Copies of the translations of the Japanese Patent Applications are attached.

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Claims 7 through 12 stand rejected under 35 U.S.C. § 103 as being unpatentable over Kinoshita in view of Mitsui.

Reference is made to the final rejection, the briefs and the answer for the respective positions of the appellant and the examiner.

OPINION

The obviousness rejection of claims 7 through 12 is reversed.

The examiner is of the opinion (final rejection, pages 2 and 3) that Kinoshita discloses all of the claimed structure except that "Kinoshita does not disclose that the bent segments of the lead extend in different directions." In view of Mitsui's teaching of "a semiconductor device having a lead (1) having a first bent segment (11) and a second bent segment (12)," the examiner concludes (final rejection, page 3) that "it would have been obvious to a person of ordinary skill in this art at the time the invention was made to use leads having bent segments that extend in different directions in Kinoshita to prevent the mechanical breakdown of the device by absorbing the expansion and contraction of the lead at the time of molding as taught by Mitsui" (final rejection, page

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3).

Mitsui clearly explains (translation, page 3) that because "the shaped-altered section made in the tip end of the inner lead absorbs the expansion or contraction of the lead generated in the heating process at the time of bonding or molding, the mechanical damage or defective connection can be prevented."

Appellant's argument (Brief, pages 6 and 7) to the contrary notwithstanding, we agree with the examiner that it would have been obvious to one of ordinary skill in the art to alter the shape of the tip end of the inner lead of Kinoshita for the advantage noted by Mitsui. On the other hand, we agree with appellant that the claims would still not be met by the combined teachings of the references because claim 7 "requires that the recited inner lead have a second portion that is (a) relatively narrower than the bonding part, (b) adhered to the insulating layer, and (c) composed of first and second bent segments on the insulating layer" (Brief, page 5), claim 9 requires that "the lead terminal has a first portion which is narrower than the bonding part and a second portion extending perpendicular thereto, with each of the first and second portions being adhered to the insulating layer,"

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(Brief, page 6), and claim 11 requires

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"a cut-off portion of the inner lead which exposes a part of the underlying insulating layer between the first bonding part and a remaining part of the recited first portion" (Brief, page 7).

Inasmuch as the applied references neither teach nor would have suggested the recited inner lead structure and relative widths, we will reverse the obviousness rejection of claims 7 through 12.

DECISION

The decision of the examiner rejecting claims 7 through 12 under 35 U.S.C. § 103 is reversed.

REVERSED

KENNETH W. HAIRSTON
Administrative Patent Judge

JERRY SMITH
Administrative Patent Judge

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| STUART S. LEVY |) | |
| Administrative Patent Judge |) | |

KWH:hh

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